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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/718,438

11/20/2003

Wolfgang Rein

9101.00005

9834

10534 7590 04/16/2008

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2075 WEST BIG BEAVER ROAD
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EXAMINER

MCMAHON, MARGUERITE J

ART UNIT

PAPER NUMBER

3747

MAIL DATE

DELIVERY MODE

04/16/2008

PAPER

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte WOLFGANG REIN and JONATHAN DOUGLAS

Appeal 2008-0296
Application 10/718,438
Technology Center 3700

Decided: April 16, 2008

Before TERRY J. OWENS, DAVID B. WALKER, and
BIBHU R. MOHANTY, *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

DECISION ON APPEAL

The Appellants appeal from a rejection of claims 1-20, which are all of the pending claims.

THE INVENTION

The Appellants claim a piston and connecting rod assembly. Claim 1 is illustrative:

1. A piston and connecting rod assembly for use with an internal combustion engine, said assembly comprising:

a piston adapted for reciprocal movement within a cylinder of the internal combustion engine, said piston having a body including a pin bore formed therein;

a connecting rod adapted to interconnect said piston and a crankshaft so as to translate the reciprocal movement of the piston into rotational movement of the crankshaft, said connecting rod having first and second ends with at least one of said ends including a bore extending therethrough and adapted to be aligned with said pin bore in said piston;

a pin adapted to be operatively received through said aligned pin bore in said piston and said bore extending through said end of said connecting rod, said pin including a pair of distal ends, a center portion formed therebetween and a smoothly profiled outer circumference that is substantially circular in cross-section with a larger diameter at said distal ends than at said center portion and tapers gradually from said distal ends to said center portions; and

said end of said connecting rod aligned with said piston pin bore including a phosphatized coating that is adapted to facilitate relative angular movement between said bore extending through said connecting rod and said outer circumference of said profiled piston pin thereby facilitating reciprocal motion of said piston relative to the cylinder of an internal combustion engine, said phosphatized coating having a thickness between two and less than eight microns.

THE REFERENCES

References relied upon by the Examiner

Fangman	US 3,479,929	Nov. 25, 1969
DeBiasse	US 4,984,544	Jan. 15, 1991
Lindstrom	US 5,039,285	Aug. 13, 1991
Arai (JP '063) (as translated)	JP 04-000063	Jan. 6, 1992
Hart	US 6,557,457 B1	May 6, 2003

Reference relied upon by the Appellants

Uehara	US 6,769,518 B2	Aug. 3, 2004
	(§ 371 (c)(1), (2), (4) date Oct. 30, 2002)	

THE REJECTIONS

The claims stand rejected under 35 U.S.C. § 103 as follows: claims 1, 2, 4-8, 11-13, 15 and 16 over JP '063 in view of Hart; claims 3, 9 and 18-20 over JP '063 in view of Hart and Lindstrom; claims 10 and 14 over JP '063 in view of Hart and Fangman; and claim 17 over JP '063 in view of Hart and DeBiasse.

OPINION

We affirm the Examiner's rejections.

Rejection of claims 1, 2, 4-8, 11-13, 15 and 16 over JP '063 in view of Hart

JP '063 discloses a piston pin (1) comprising a cylindrical central area (4) having at each end thereof an outwardly-flared end (5, 6) that matches the taper of a pin boss (2a) which it engages (p. 2; fig. 1). Piston pin 1 is a two-piece pin (p. 1). The first piece comprises central area 4, a tapered end (5) at one end of central area 4, and a shaft (8) at the other end

of central area 4 (p. 4). The second piece is a tapered end member (1B) that is press-fit onto shaft 8 (p. 4, fig. 1). Central area 4 fits within the bore of the smaller end (3a) of a connecting rod (3), and there is what appears to be a bushing between central area 4 and that bore. *See id.*

Hart discloses, for heavy duty diesel applications, a wrist piston (32) between aligned bores (20, 28) of a piston body (12) and a connecting rod (24) (col. 1, ll. 14-15; col. 2, ll. 38-40). To provide the necessary tribological properties of the assembly without the usual bushing, either 1) at least one of the wrist pin 32 running surface (34) and the connecting rod 24 running surface (30), or 2) at least one of the wrist pin 32 running surface 34 and the piston body 12 running surface (22), are coated with a coating (36) that preferably is manganese phosphate and preferably has a thickness of about 8.0 to 15.0 μm (col. 2, ll. 48-59; col. 3, ll. 9-12; col. 3, ll. 46-49). Elimination of the bushing eliminates concerns for mechanical (e.g., abrasion), chemical (e.g., corrosion) and temperature limitations of the usual bushings (col. 2, l. 62 – col. 3, l. 6). The coating is fairly open and porous and has a coarse crystalline structure which absorbs and traps lubricating oil to act as a solid lubricant under boundary lubrication conditions (i.e., low load) and to develop a desirable stiff lubricant squeeze film between the running surfaces of wrist pin 32 and connecting rod 24 under heavy load (col. 3, ll. 13-23).

The Appellants argue that JP '063 does not disclose or suggest a piston pin having a smoothly profiled outer circumference that tapers gradually from the distal ends to the center portion (Br. 11).

During patent prosecution, claims are to be given their broadest reasonable interpretation consistent with the Specification, as the claim language would have been read by one of ordinary skill in the art in view of the Specification. *See In re Zletz*, 893 F.2d 319, 321 (Fed. Cir. 1989); *In re Sneed*, 710 F.2d 1544, 1548 (Fed. Cir. 1983).

The Appellants' original disclosure does not state that the piston pin has a smoothly profiled outer circumference that tapers gradually from the distal ends to the center portion. That claim limitation was added by amendment (filed April 14, 2005). The Appellants' original Specification states:

The pin includes a pair of distal ends, a center portion formed therebetween and a profiled outer circumference that is substantially circular in cross-section with a larger diameter at the distal ends than at the center portion [¶ 0012].

* * *

[A]s shown in Figure 3, the preferred embodiment of the piston pin 26 of the present invention includes a profiled outer circumference that is substantially circular in cross-section with a larger diameter at the distal ends 56, 58 than at the center portion 60 [¶ 0032].

The piston pin in the Appellants' figure 3 has an abrupt change from cylindrical center portion (60) to outwardly-flared, non-curved distal ends (56, 58).

Thus, when the "smoothly profiled outer circumference" and "tapers gradually" language in the Appellants' claims is given its broadest reasonable interpretation consistent with the original disclosure, that language encompass the JP '063 piston pin having cylindrical central area 4 with outwardly-flared tapered ends 5, 1B.

The Appellants argue that JP ‘063 does not disclose or suggest a phosphatized coating and an internal gallery, and Hart does not disclose or suggest a smoothly profiled piston pin that gradually tapers from the distal ends to the center portion (Br. 11-13).

The Appellants’ argument is deficient in that the Appellants are attacking the references individually when the rejection is based on a combination of references. *See In re Keller*, 642 F.2d 413, 426 (CCPA 1981); *In re Young*, 403 F.2d 754, 757-58 (CCPA 1968). The Examiner relies upon Hart for a disclosure of a phosphatized coating, Lindstrom for a disclosure of an internal gallery, and JP ‘063 for a disclosure of a smoothly profiled piston pin that tapers gradually from the distal ends to the center portion (Ans. 3-5).

The Appellants argue that there is no motivation to combine JP ‘063 and Hart because Hart’s bushingless piston pin is diametrically opposed to the JP ‘063 piston pin used with a bushing (Br. 19-20).

The motivation to combine the disclosures of JP ‘063 and Hart would have been to obtain the benefits disclosed by Hart (col. 2, l. 62 – col. 3, l. 6; col. 3, ll. 13-23) of using the disclosed coating rather than a bushing.

The Appellants argue that Hart discloses a phosphate coating having a preferred thickness about 8.0 to 15.0 microns (col. 3, ll. 9-12), not a thickness of between 2 and less than 8 microns (Br. 20-21).

The Appellants’ original Specification does not include a disclosure of a thickness of less than 8 microns. That claim limitation was added by amendment (filed November 16, 2004). The original Specification discloses “a thickness between two and eight microns” (¶¶ 0012, 0041; original claim

1). Thus, when the Appellants' claims are given their broadest reasonable interpretation in view of the Appellants' original Specification, "less than 8" includes values that are less than but essentially 8 and, therefore, clearly within Hart's "about 8.0" (col. 3, l. 12).

The Appellants argue that "Uehara et al. '518 provides support for Applicants' position that different coating thicknesses provide different properties. (See Uehara et al. '518, Column 2, Lines 57-63)" (Br. 21).

That portion of Uehara discloses:

The thickness of the phosphate coating may be increased, but the improvement in rust preventive performance becomes saturated when the thickness of the phosphate coating reaches about 10 μm . Thus, the thickness of the phosphate coating is adjusted to a maximum of about 8 μm , preferably about 2 to 8 μm , in view of rust preventive performance in the present invention.

Uehara's disclosure of a thickness range of up to 10 μm clearly would not have discouraged one of ordinary skill in the art from using the lower end of Hart's preferred thickness range, i.e., about 8.0 μm (col. 3, l. 12).

The Appellants argue that a coating thickness of 8 to 15 microns at the small end of a connecting rod would cause wear, vibration, engine noise and reduced engine reliability (Br. 21-22).

The Appellants' argument is mere unsupported attorney argument, and arguments of counsel cannot take the place of evidence. *See In re De Blauwe*, 736 F.2d 699, 705 (Fed. Cir. 1984). Moreover, as pointed out above, the Appellants' thickness of less than 8 microns includes values within Hart's "about 8.0 μm " (col. 3, l. 12). Thus, at least at that thickness, the Appellants are arguing a distinction that does not exist.

We therefore are not persuaded of reversible error in the rejection of claims 1, 2, 4-8, 11-13, 15 and 16.

*Rejection of claims 3, 9 and 18-20 over
JP '063 in view of Hart and Lindstrom*

Lindstrom discloses “lubrication systems for the connecting rod, piston, and wrist pin of a hermetic compressor” (col. 1, ll. 8-9). The connecting rod (42) has a central port (66) (which corresponds to the Appellants’ internal gallery (67, fig. 2)) through which oil is pumped to the wrist pin (46) (col. 3, ll. 50-52; col. 4, ll. 14-16; fig. 1).

The Appellants argue that Lindstrom bears no relation to the combination of a smoothly profiled piston pin and a bushingless connecting rod including a phosphatized coating for use in an internal combustion engine (Br. 22).

The Examiner argues that it would have been obvious to one of ordinary skill in the art to use Lindstrom’s central port 66 in the connecting rod of the JP ‘063/Hart combination to facilitate lubrication of the piston pin (Ans. 5). That argument is plausible and the Appellants have not explained why it is in error.

Hence, the Appellants have not persuaded us of reversible error in the rejection of claims 3, 9 and 18-20.

*Rejections of claims 10 and 14 over JP '063
in view of Hart and Fangman and claim 17
over JP '063 in view of Hart and DeBiasse*

The Appellants merely argue that Fangman and DeBiasse do not remedy the deficiencies in JP ‘063 and Hart argued by the Appellants as discussed above (Br. 13-14).¹

As pointed out above, those deficiencies do not exist. Hence, the Appellants have not convinced us of reversible error in the rejections of claims 10, 14 and 17.

DECISION

The rejections under 35 U.S.C. § 103 of claims 1, 2, 4-8, 11-13, 15 and 16 over JP ‘063 in view of Hart, claims 3, 9 and 18-20 over JP ‘063 in view of Hart and Lindstrom, claims 10 and 14 over JP ‘063 in view of Hart and Fangman, and claim 17 over JP ‘063 in view of Hart and DeBiasse are affirmed.

¹ The Appellants’ argument that Fangman and DeBiasse do not disclose the internal gallery in claim 18 (Br. 13-14) is irrelevant because Fangman and DeBiasse are not applied to that claim.

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No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv) (2007).

AFFIRMED

vsh

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